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BROWN reports no determinations of osmotic pressure, but finds that if closed leaves of *Dionaea* are killed, before the extension of the cells has become fixed, and passed through alcohol to xylene, the leaves reopen, and close again when passed back through alcohol to water. He concludes that the increase in size of the cells is due to increased osmotic pressure. He believes there is no permeability change, and thinks changes in the elasticity of the cell walls improbable. It is interesting if, in fact, the mechanics of these two responses, so similar in many respects, are so widely different in another.

Geotropic bending of growing organs is similar in many respects to the movements studied. Its comparative slowness should make it somewhat easier to follow, and the results might furnish valuable suggestions as to the mechanics of these more rapid movements. SMALL²⁷ has found differences in permeability in the two flanks of *Vicia Faba*, roots bending geotropically.—THOMAS G. PHILLIPS.

Soil moisture studies.—The extensive investigations of BRIGGS and SHANTZ have shown the importance of the moisture equivalent as a constant that will measure the physical properties of soils. Two recent studies deal with certain phases of the same phenomena. The first²⁸ shows that while the addition of various salts does not materially change the moisture equivalent of the soil under investigation, if the same salts are washed from the soil with water it then seems to possess a new and peculiar set of physical properties and its moisture equivalent is markedly increased. This increase varies from 2 to 40 per cent, and is taken to mean that the washing out of the salt has increased the interior surface of the soil.

The second article, by SMITH,²⁹ reports the investigation of the relationship between the results of mechanical analysis and the moisture equivalent. He concludes that there is at present no formula that gives more than a rough approximation of this relationship, and hence that the moisture equivalent cannot be indirectly determined by mechanical analysis with any degree of accuracy.—GEO. D. FULLER.

Soil aeration and root growth.—Roots of various plants appear, according to the results of CANNON and FREE,³⁰ to respond quite differently to variations in the composition of the soil atmosphere, and this difference in response seems

²⁷ SMALL, JAMES, Geotropism and the Weber-Fechner law. *Ann. Botany* 31:313-314. 1917.

²⁸ SHARP, L. T., and WAYNICK, D. D., The moisture equivalent determinations of salt-treated soils and their relation to changes in the interior surfaces. *Soil Sci.* 4:463-469. 1917.

²⁹ SMITH, ALFRED, Relation of the mechanical analysis to the moisture equivalent of soils. *Soil Sci.* 4:471-476. 1917.

³⁰ CANNON, W. A., and FREE, E. E., The ecological significance of soil aeration. *Science, N.S.* 45:178-180. 1917.

to be related to the character of the natural habitat of the species in question. Thus *Salix* sp. (probably *nigra*) stands at one end of the series and shows no injurious effect even when the oxygen of the atmosphere is entirely replaced by either nitrogen or carbon dioxide. At the opposite end of the series stands *Opuntia versicolor*, growth of roots ceasing with an atmosphere containing 50 per cent carbon dioxide, while *Coleus Blumei* is comparable to it, showing injury and ultimate death with the addition of 25 per cent nitrogen to the soil atmosphere. Of the other species tested *Heliotropium peruvianum* was closely comparable to *Opuntia*, while *Nerium oleander* and *Prosopis velutina* prove nearly as resistant as *Salix*. The results seem to indicate that plants growing naturally in well drained soil are much more sensitive to the composition of the soil atmosphere than those from swamps and poorly drained habitats.—GEO. D. FULLER.

Embryo of *Aucuba*.—PALM and RUTGERS³¹ have settled the question of apogamy in *Aucuba japonica*, which has been under suspicion for 40 years. They bagged 300 pistillate flowers and not a single fruit formed, while 600 isolated pistillate flowers produced normal fruit after artificial pollination. It is thought that EICHLER's original suggestion of apogamy probably came from the fruiting of an isolated pistillate plant which had developed staminate flowers, since the authors have repeatedly found staminate flowers on pistillate plants. Staminate plants have also been observed to produce pistillate flowers.

The flowers open about the time of megaspore formation, and the embryo sac reaches the fertilization stage about 4 weeks later. The solitary megaspore mother cell becomes deeply placed by the extensive development of parietal tissue. The behavior of the 4 megaspores is usually quite normal, but in one case the 2 megaspores nearest the chalaza were found in division. The development of the gametophyte is normal, but stages in endosperm formation were not obtained. The chromosome numbers were determined to be 18 and 36.—J. M. C.

Disease resistance.—JONES³² has published a summary of his results in securing a race of cabbage resistant to the "yellows." Some of the fundamental questions involved in resistance were considered. The difference between susceptible and resistant plants was found not to be due to any superficial obstacle, but to the different relations of the interior cells of the host and parasite. "The resistant tissues have the ability to restrain the development of the parasite to a greater degree than do the susceptible and so give time for protective cork formation." It was shown also that resistance is clearly inheritable, not as a single character, but as a complex of a number of heritable

³¹ PALM, B. J., and RUTGERS, A. A. L., The embryology of *Aucuba japonica*. Rec. Trav. Bot. Néerland. 14:119-126. figs. 12. 1917.

³² JONES, L. R., Disease resistance in cabbage. Proc. Nat. Acad. Sci. 4:42-46. 1918.